NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Water and Sediment Control Basin

(Number)

Code 638

DEFINITION

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and a water detention basin.

PURPOSES

To improve the ability to farm sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where:

1. The topography is generally irregular.
2. Watercourse and gully erosion is a problem.
3. Sheet and rill erosion is controlled by other conservation practices.
4. Runoff and sediment has damaged land and improvements.
5. Soil and site conditions are suitable.
6. Adequate outlets are available or can be provided.

This practice is not applicable to watercourses where construction of the basin would destroy important woody wildlife cover and the present watercourse is capable of handling the concentrated runoff without serious erosion. Such situations are usually recognized by a meandering condition, steep side slopes that are stabilized by woody plants or herbaceous vegetation, and the watercourse is without rapidly advancing overfalls.

Water and sediment control basins shall not be used in place of terraces. When a ridge and channel extend beyond the detention basin or level embankment, terraces shall be planned. The planned management system must reduce soil loss in the interval above and below the basin to prevent excessive maintenance and operation problems.

The uncontrolled drainage area to a single basin shall not exceed 30 acres

CRITERIA

The installation and operation of water and sediment control basin(s) shall comply with all Federal, State, Local Laws, Rules and Regulations.

Spacing

The grade of the watercourse between basins shall be considered, and the spacing shall be set to prevent watercourse or gully erosion. The drainage of each basin shall be limited so duration of ponding, infiltration, or seepage does not damage crops or create other problems.

If water and sediment control basins are to be used in conjunction with existing or planned terraces, the spacing shall be compatible with the appropriate terrace spacing.

Runoff shall not be ponded on neighboring property without written permission of all landowners involved in the project.

Alignment

The embankment orientation and row direction shall be approximately perpendicular to the land slope to permit contouring as near as possible. The arrangement shall permit farmability without excessive short point rows or sharp curves. Field boundaries and row length shall also be considered when determining basin location and row direction. If feasible, systems of water and sediment control basins shall be parallel. Land forming, extra cut or fill along basin line, multiple outlets, variations in grade channel blocks and other methods shall be used to achieve good alignment.

Cross-Section

Embankment slopes shall not be steeper than two (2) horizontal to one (1) vertical.

All constructed slopes less than 5:1 shall be vegetated.

The effective top width and height shall be at least as wide as shown in the following. Effective fill height is from low point of natural ground at centerline of embankment to low point of fill.

Fill height (ft)	Effective top width (ft)
0-5.0	3
5.1-10	6
10.1-15	8

The constructed height of the embankment shall be at least 10 percent greater than the designed height to allow for settlement. The maximum settled height shall be 15 feet measured from the natural ground at the centerline of the embankment

Capacity

The basin shall be designed to control the runoff from a 10-year, 24-hour-frequency storm without overtopping. The capacity of basins designed to provide downstream runoff protection or to function with other structures may be larger and shall be adequate to control the runoff from a storm of a frequency consistent with the potential hazard. The basin also shall have the capacity to store the anticipated 10-year sediment accumulation, unless provisions are made for periodic sediment removal from the basin to maintain the design capacity.

A minimum of one foot of freeboard may be added to the design height to provide for an emergency spillway around one or both ends of the basin.

The emergency spillway must not contribute runoff to a lower basin in series that does not have an emergency spillway, unless additional needed capacity is included in the design of the lower basin.

Channel Grades

When the storage section of the basin is extended as a ridge and channel (non-storage), the channel grades and velocities shall comply with those shown for NRCS Standard Terraces (600).

Outlets

Water and sediment control basins shall have underground outlets or soil infiltration outlets that meet the requirements for NRCS Standards Terraces (600) and Underground Outlets (620).

Vegetation

Slopes and disturbed areas that are not to be farmed shall be established to suitable erosion-resistant vegetation. If soil or climatic conditions preclude the use of vegetative cover and protection is needed, organic or gravel mulch may be used. Seedbed preparation, fertilizing, seeding, and mulching shall be in accordance with NRCS Standard Critical Area Planting (342).

CONSIDERATIONS

When runoff will be ponded on neighboring property, consider recording a legal document outlining or identifying ponded area(s).

The system of basins and row arrangements should be parallel when possible and spaced to accommodate farm machinery widths. Consideration should be given to embankment slope lengths, top width, and inlet location when determining spacing.

Additional height in excess of settlement may be considered to prevent storms in excess of the design storm frequency from overtopping the middle of the dam. This should be considered in situations where overtopping the middle would have some likelihood of breaching such as short, high fills, steep backslopes, and large drainage areas.

Where land ownership or physical conditions preclude treatment of the upper portion of a slope with terraces, a water and sediment control basin may be used to separate this area from, and permit treatment to the lower part of the slope.

Water and sediment control basins should be part of the treatment needed to protect the soil, water, plant, animal and air resources. In addition, practices such as terraces, contouring, a conservation crop rotation, conservation tillage, and crop residue management should also be used to control erosion and protect the other resources.

Consider giving special attention to maintaining and improving visual resources and habitat for wildlife where applicable. Environmental quality and wildlife food and habitat should be considered in selecting the species of vegetation.

Effects on water quantity and quality shall be considered. This practice may reduce the volume and rate of discharge by using underground outlets. With underground outlets infiltration through the catchment area will increase and runoff will be decreased. Deep percolation and ground water re-charge may occur when conditions permit. Consider the effects basins may have on discharge to the watershed.

Consider using grass buffers around each riser to help reduce sediment, nutrient, and pesticide contamination of the runoff.

Consideration should be given to Nutrient, Pest, Animal Waste Management planning, and residue management to the soils tolerable soil loss limits (T).

Consider constructing side slopes 3 to 1 or flatter when mowing of vegetation is part of maintenance or weed control.

Where underground outlets are located under a basin ridge, mechanical compaction or water packing should be used. Installation and backfill of conduit trenches should be made in advance of other fill placement to allow adequate settlement.

If deep cuts expose subsoil, consider removal and stockpiling topsoil to topdress exposed areas.

PLANS AND SPECIFICATIONS

Plans and specifications for installing water and sediment control basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

A maintenance program shall be established by the landowner/user to maintain the configuration of the embankment, design capacity of the basin, vegetative cover, and the outlet. Items to consider are:

1. Inspect inlets for clogging and embankment failure after each large storm. Failures should be corrected as soon as possible to prevent major damages.

2. Sediment and design capacity should be maintained by removing sediment from the basin or by raising the embankment height.

3. Place excavated material on the cropland to maintain fertility and enhance topography.

4. Fill material for increasing the embankment height should be obtained in a manner that enhances topography and maintains productivity of the cropland.

5. Maintain vegetation on steep back slope embankment to prevent sheet and rill erosion or gullying.

6. Control all trees, woody cover and noxious weeds from embankment areas by hand, mechanical or chemical means. Only use chemicals recommended for this purpose.

7. Repair all broken or damaged inlets and underground outlets.

8. Maintain effective conservation treatment of the contributing watershed to prevent excessive siltation and the resulting loss of capacity in the basin.

Safety

Basins with steep backslopes can be very hazardous. Machinery should be kept away from steep backslopes. All cut slopes and fills that are to be farmed must be no steeper than that on which farm equipment can operate safely. All hazards must be brought to the attention of the landowner/user. Chemicals used shall be used according to label.